Shared Memory Layer for Spark Applications
Fast Data Meets Open Source

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Agenda

• About In-Memory Computing
• Advanced Clustering
• Data Grid
• Streaming & CEP
• Share State Across Spark Jobs
• In-Memory MapReduce
• Interactive SQL
• DevOps: Yarn and Mesos
• Q & A
Apache Ignite for BI and Analytics
Apache Ignite™ In-Memory Data Fabric: Strategic Approach to IMC

- Supports Applications of various types and languages
- Open Source – Apache 2.0
- Simple Java APIs
- 1 JAR Dependency
- High Performance & Scale
- Automatic Fault Tolerance
- Management/Monitoring
- Runs on Commodity Hardware
- Supports existing & new data sources
- No need to rip & replace

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Apache Ignite: Better Cloud Support

- **Automatic Cloud Discovery**
  - Simple Configuration
  - AWS/EC2/S3
  - Google Compute Engine (NEW)
  - Other Clouds with JClouds (NEW)

- **Docker Support**
  - Automatically Build and Deploy
Data Grid: JCache (JSR 107)

- JCache (JSR 107)
  - Basic Cache Operations
  - ConcurrentMap APIs
  - Collocated Processing (EntryProcessor)
  - Events and Metrics
  - Pluggable Persistence
- Ignite Data Grid
  - ACID Transactions
  - SQL Queries (ANSI 99)
  - In-Memory Indexes
  - Automatic RDBMS Integration
Data Grid: Partitioned Cache

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Data Grid: Replicated Cache
DevOps: Integration with Yarn and Mesos

- Automatic Resource Management
- Easy Data Center Installation
- Easy Data Center Configuration
- On-Demand Elasticity
Data Grid: Off-Heap Memory

- Unlimited Vertical Scale
- Avoid Java Garbage Collection Pauses
- Small On-Heap Footprint
- Large Off-Heap Footprint
- Off-Heap Indexes
- Full RAM Utilization
- Simple Configuration
Share RDDs Across Spark Jobs

- **IgniteRDD**
  - Share RDD across jobs on the host
  - Share RDD across jobs in the application
  - Share RDD globally

- **Faster SQL**
  - In-Memory Indexes
  - SQL on top of Shared RDD
Ignite In-Memory File System

- Ignite In-Memory File System (IGFS)
  - Hadoop-compliant
  - Easy to Install
  - On-Heap and Off-Heap
  - Caching Layer for HDFS
  - Write-through and Read-through HDFS
  - Performance Boost
Ignite In-Memory Map Reduce

- In-Memory Native Performance
- Zero Code Change
- Use existing MR code
- Use existing Hive queries
- No Name Node
- No Network Noise
- In-Process Data Colocation
- Eager Push Scheduling
Data Grid: Ad-Hoc SQL (ANSI 99)

- ANSI-99 SQL
- Always Consistent
- Fault Tolerant
- In-Memory Indexes (On-Heap and Off-Heap)
- Automatic Group By, Aggregations, Sorting
- Cross-Cache Joins, Unions, etc.
- Ad-Hoc SQL Support
SQL Cross-Cache JOIN Example

IgniteCache<AffinityKey<UUID>, Person> cache = ignite.cache("persons");

// Execute query to get names of all employees.
SqlFieldsQuery qry = new SqlFieldsQuery(
    "select concat(firstName, ' ', lastName), org.name " +
    "from Person, " +""Organizations" + " .Organization as org " +
    "where Person.orgId = org.id";

QueryCursor<List<?>> cursor = cache.query(qry);

for (List<?> row : cursor)
    print(row);
SQL Cross-Cache GROUP BY Example

IgniteCache<AffinityKey<UUID>, Person> cache = ignite.cache("persons");

// Query to get salaries grouped by organization.
SqlFieldsQuery qry = new SqlFieldsQuery(
    "select org.name, avg(salary), max(salary), min(salary) " +
    "from Person, ""Organizations".Organization as org " +
    "where Person.orgId = org.id " +
    "group by org.name " +
    "order by org.name");

QueryCursor<List<?>> cursor = cache.query(qry);

List<List<?>> res = cursor.getAll();
Interactive SQL with Apache Zeppelin
ANY QUESTIONS?

Thank you for joining us. Follow the conversation.

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